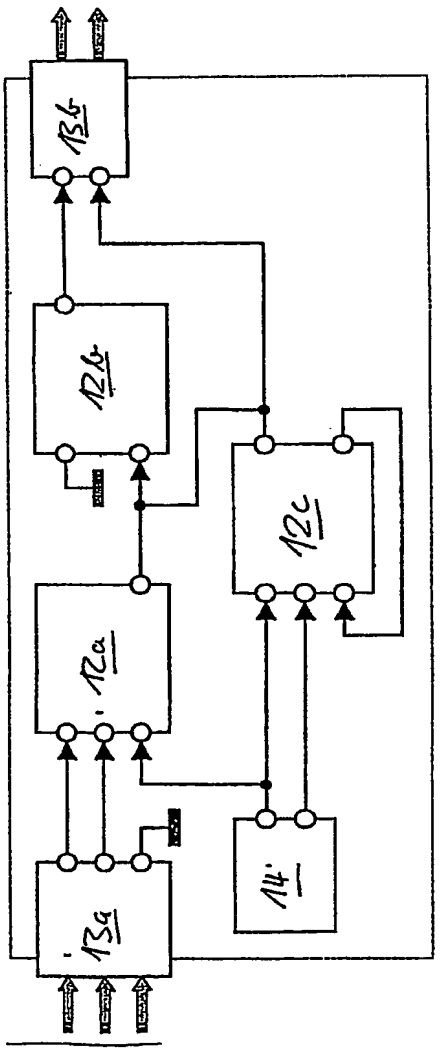
Figure1



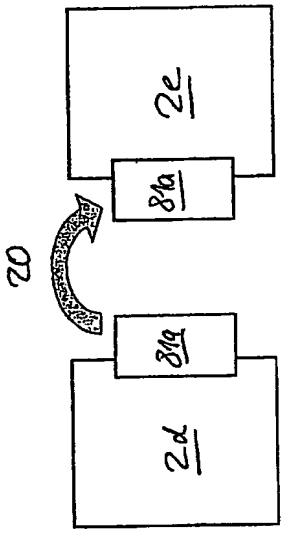


Figure2b

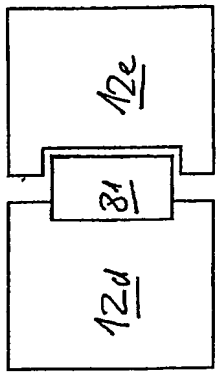


Figure2a

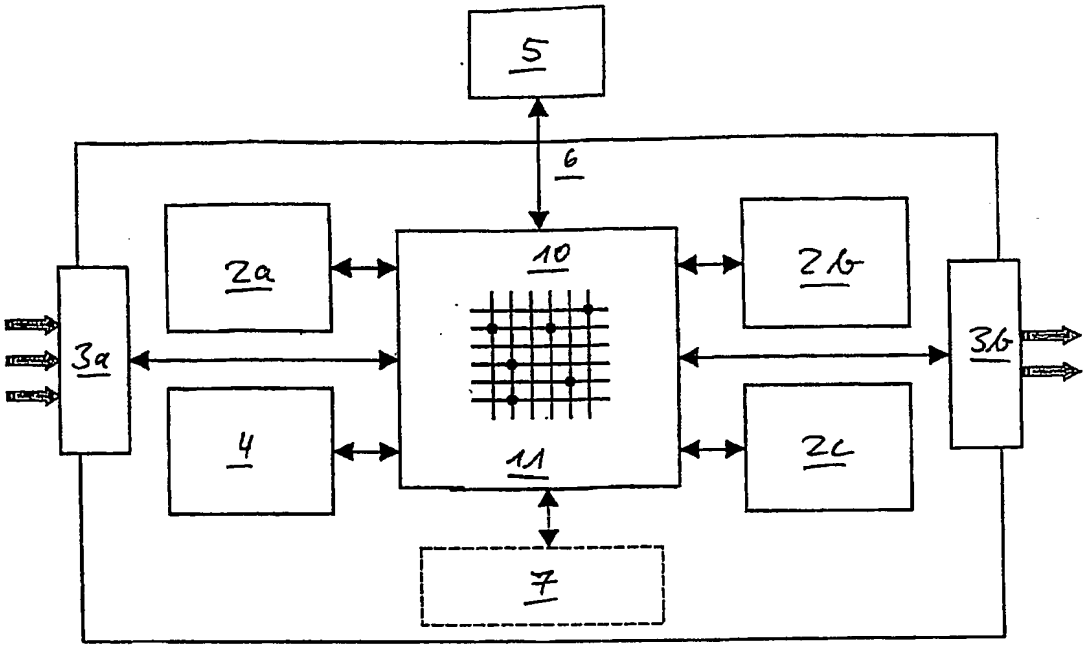


Figure3

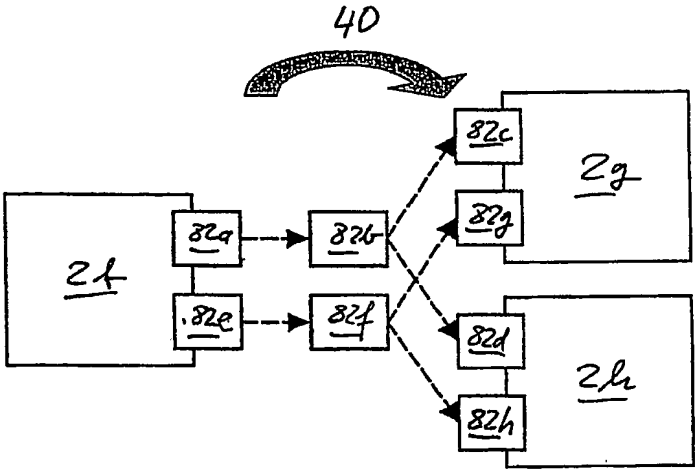


Figure4

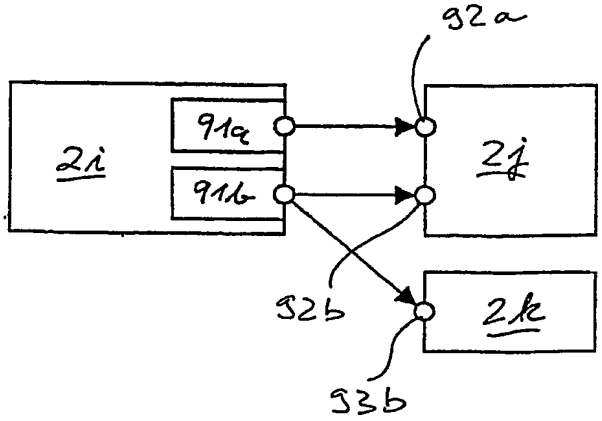


Figure5

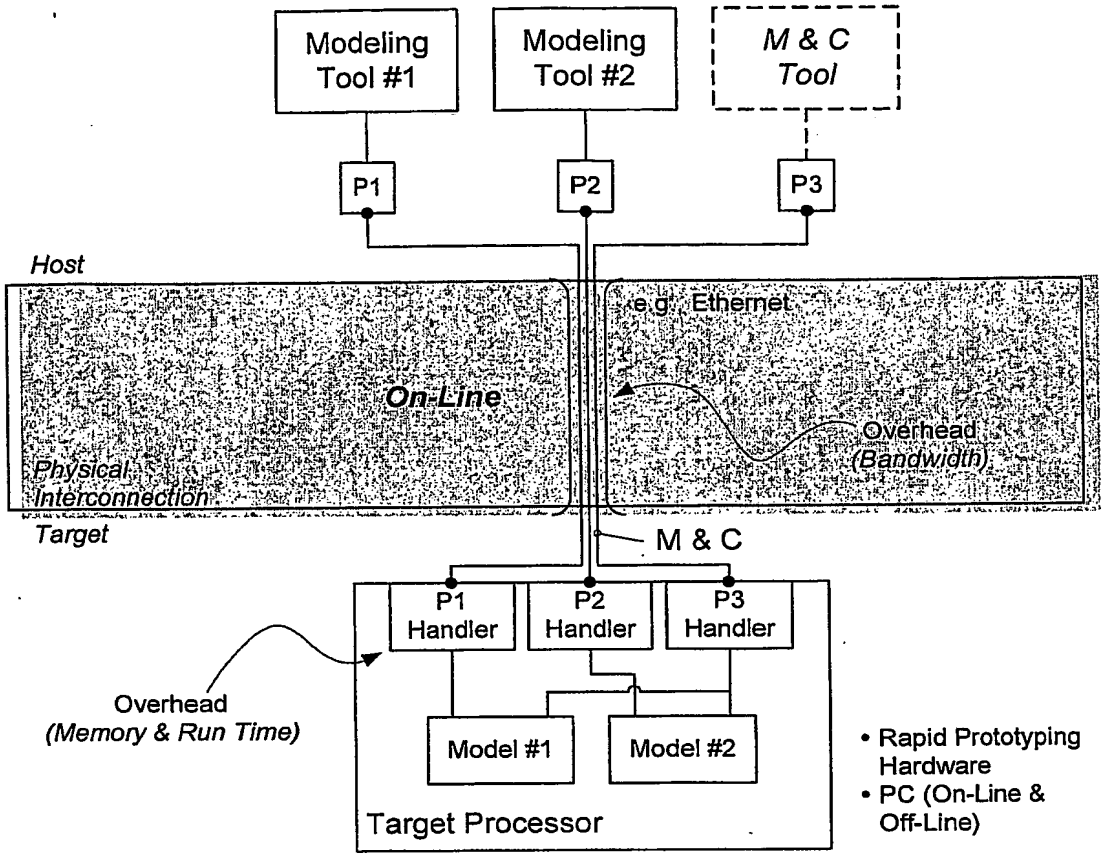

Modeling Tool #1
Modeling Tool #2
M & C Tool
P1
P2
P3
Host
e.g. Ethernet
On-Line
Overhead (Bandwidth)
Physical Interconnection
Target
M & C
P1 Handler
P2 Handler
P3 Handler
Overhead (Memory & Run Time)
Model #1
Model #2
Target Processor
• Rapid Prototyping Hardware
• PC (On-Line & Off-Line)

Fig. 6

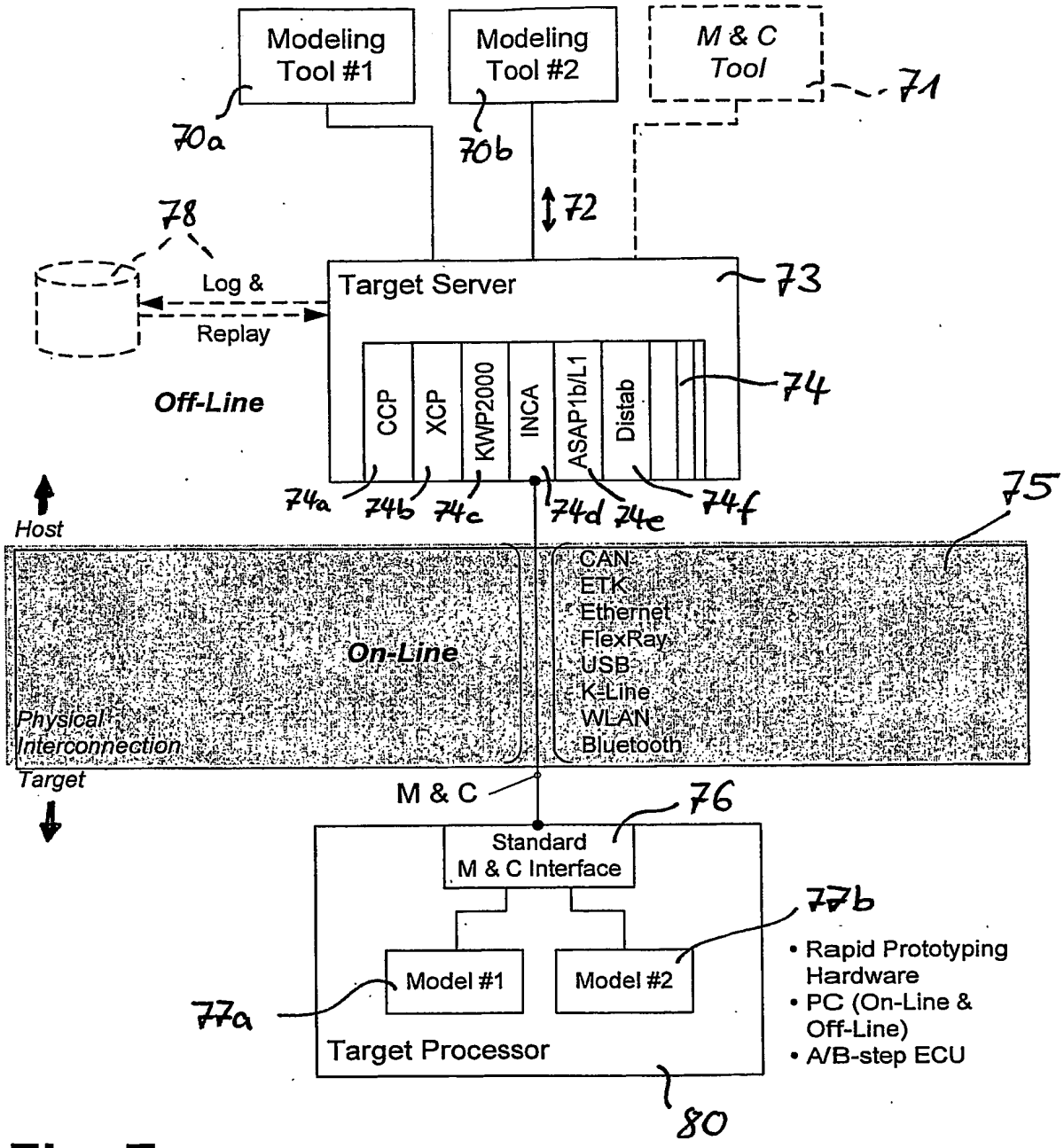

Modeling Tool #1
Modeling Tool #2
M & C Tool
71
70a
70b
72
78
Log & Replay
Off-Line
Target Server
73
CCP
XCP
KWP2000
INCA
ASAP1b/L1
Distab
74
74a
74b
74c
74d
74e
74f
75
Host
On-Line
Physical Interconnection
Target
CAN
ETK
Ethernet
FlexRay
USB
K-Line
WLAN
Bluetooth
M & C
76
Standard M & C Interface
77b
Model #1
Model #2
77a
Target Processor
80
• Rapid Prototyping Hardware
• PC (On-Line & Off-Line)
• A/B-step ECU

Fig. 7

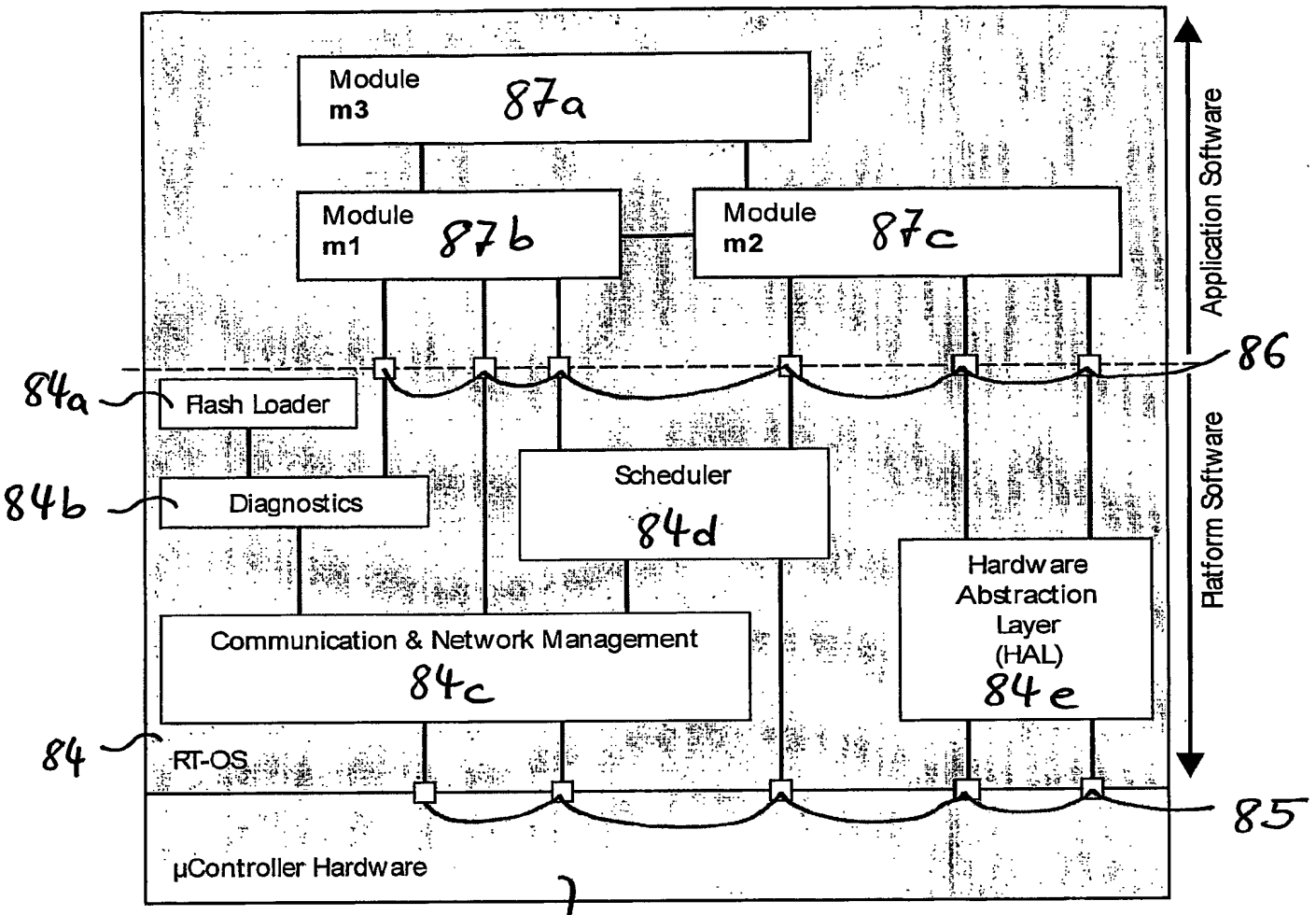

Module m3
87a
Module m1
87b
Module m2
87c
Application Software
86
84a
Flash Loader
84b
Diagnostics
Scheduler
84d
Hardware Abstraction Layer (HAL)
84e
Communication & Network Management
84c
84
RT-OS
Platform Software
85
µController Hardware
83

Fig. 8

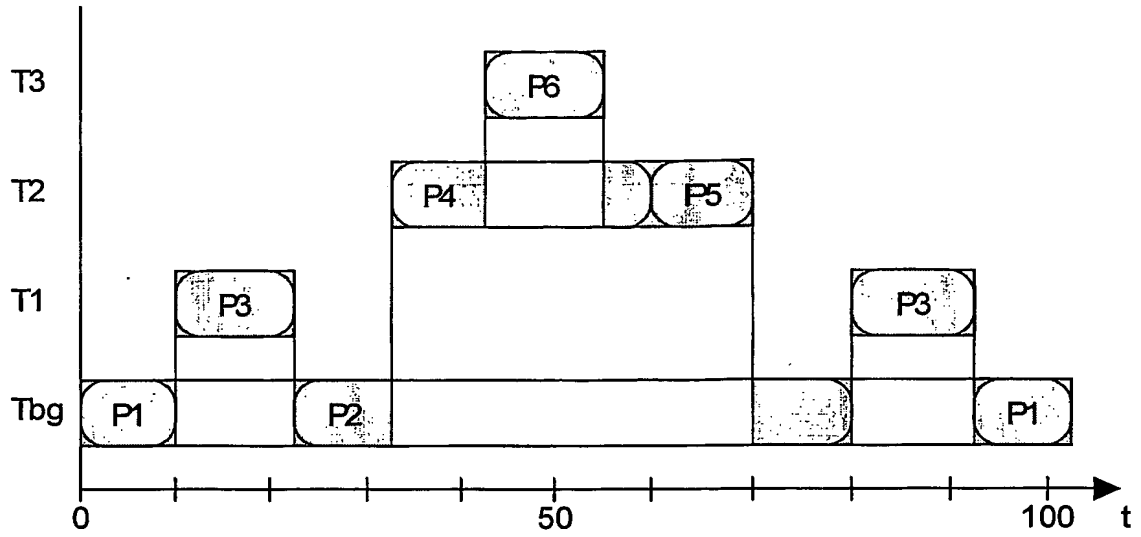

T3
T2
T1
Tbg
P6
P4
P5
P3
P3
P1
P2
P1
0
50
100
t

Fig. 9a

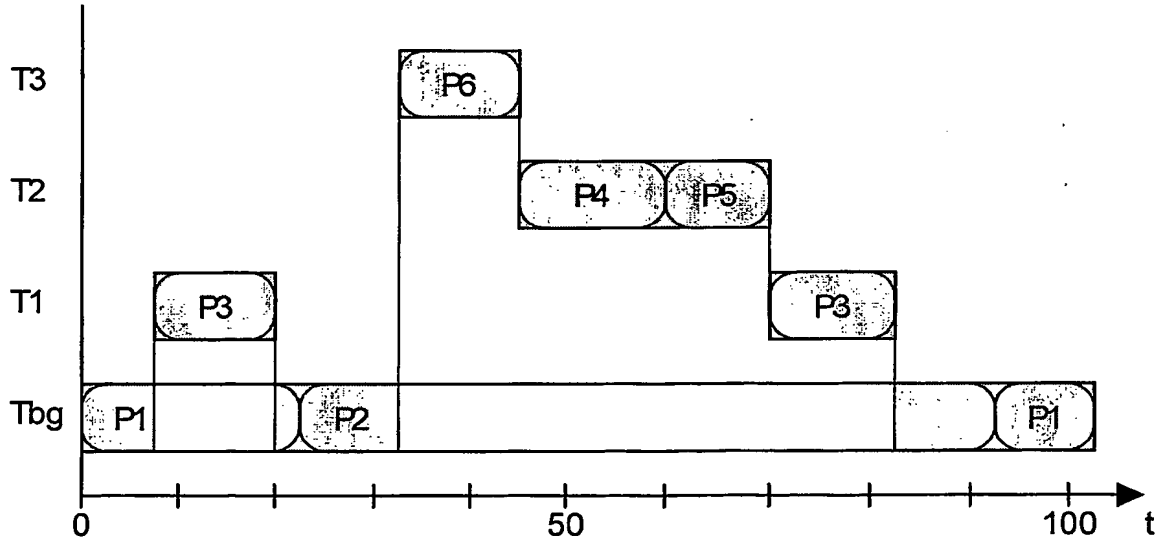

T3
T2
T1
Tbg
P6
P4
P5
P3
P3
P1
P2
P1
0
50
100
t

Fig. 9b

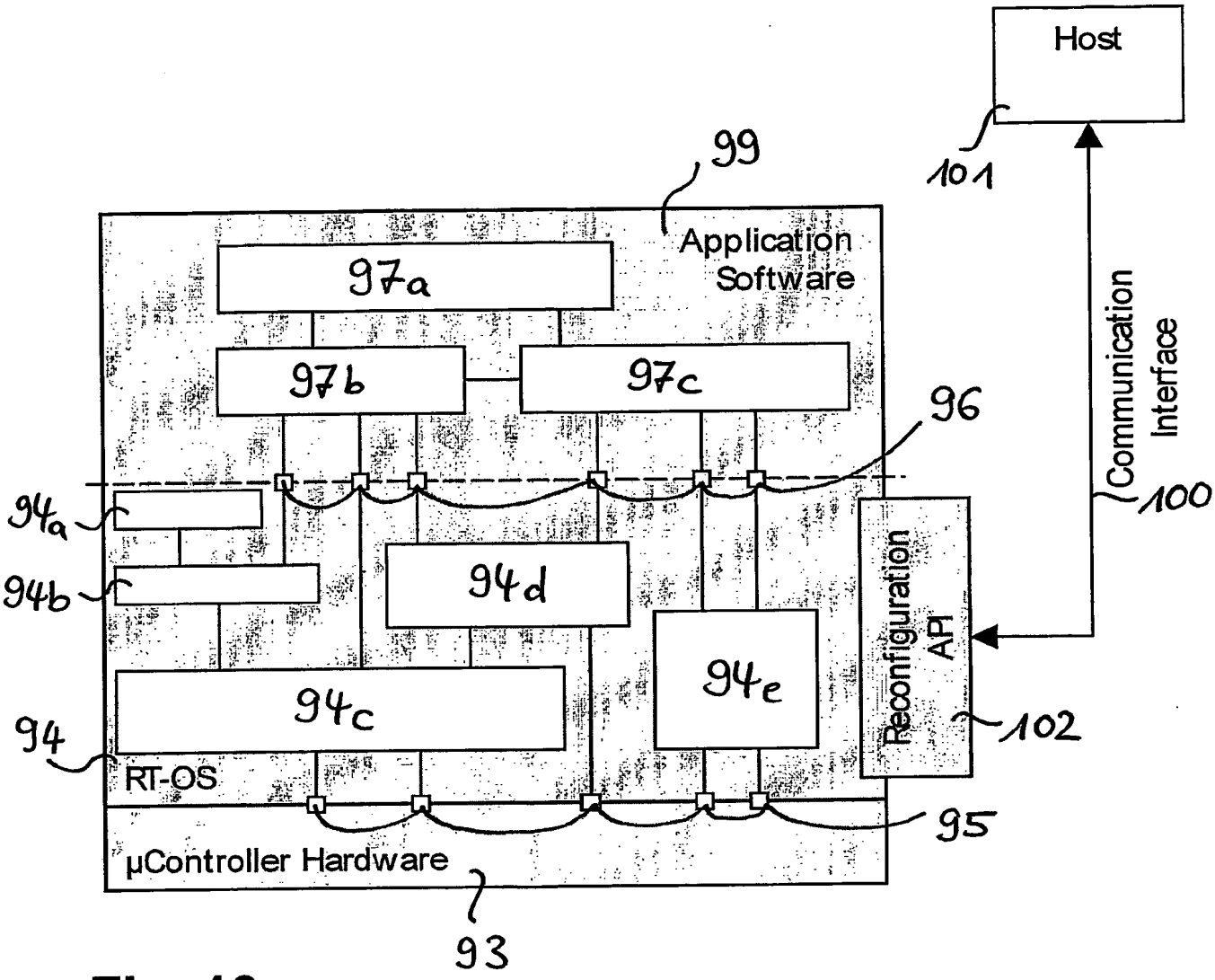

Host
101
99
Application Software
97a
97b
97c
96
Communication Interface
100
94a
94b
94d
94e
94c
94
RT-OS
Reconfiguration API
102
95
µController Hardware
93

Fig. 10